Annals of the
University of North Carolina Wilmington
International Masters of Business Administration
http://csb.uncw.edu/imba/
REAL ESTATE INVESTMENT TRUSTS AND
MARKET SENTIMENT IN THE UNITED STATES & EUROPE

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A Thesis Submitted to the
University of North Carolina Wilmington in Partial Fulfillment
of the Requirements for the Degree of
Masters in Business Administration

Cameron School of Business
University of North Carolina Wilmington

2009

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ABSTRACT

Behavior in real estate markets has come to the forefront in recent years due to a global economic collapse partly attributed to a global real estate boom. International real estate is taking an increasingly important role in the composition of a well-diversified portfolio and thus carries more systematic risk when real estate markets suffer. A relatively new investment vehicle, the Real Estate Investment Trust (REIT), may hold the key to certain truths as to the causes and developments in property markets and financial markets. REITs are a useful proxy for tracking and studying global real estate markets as volumes and liquidity in REIT markets are increasing and different regions and property types are represented. One popular theory that is relatively uncharted in real estate markets is market sentiment. Bid-ask spreads are available to simulate movements of market sentiment in REIT markets. As bid-ask spreads increase, market confidence is known to dissipate.

The research question which is answered in this thesis is: **Does market sentiment in real estate markets manifest itself in similar ways in the US and in the EU?** REIT spreads from over 300 United States and European Union-domiciled REITs are analyzed for explanations of the existence of market sentiment in the two continents. Daily REIT data is collected over a sample period from January 01, 2000 to April 30, 2008. A thorough comparison is conducted between US and EU REITs using various analytical tools to find trends and influences on market sentiment in the US and EU REITs market.

The findings differ greatly between US and EU REITs. US REIT spreads are shown to gradually increase followed by a sudden drop in the 1st quarter 2007, while the average EU REIT spread gradually closes over the sample period. US REITs are found to behave independently from outside influences such as macroeconomic stimuli and market indices. EU REITs are however in sync with outside forces. Strong relationships exist between market sentiment in Europe and macroeconomic stimuli and general and real estate-specific indices. Due to the US real estate market sentiment’s peculiar trends, it does not have any anticipative power over EU real estate market sentiment.
ACKNOWLEDGMENTS

Many people must be thanked for their aids and efforts in the completion of my thesis, due to its longevity and the amount of involvement I required for sources of motivation and knowledge. I know everyone involved had their patience tested because the expected completion date was continuously postponed. However, everyone stuck in there with me. Against the advice of several people, I took the long route, both with data collection and the literature review. I am happy for it because I feel as though I learned an enormous amount of specialized information that will hopefully help me with my future endeavor to pursue a career involving real estate investing.

I must thank the committee for keeping me on track, but also giving me the space to develop my own direction with the thesis. Thank you Dr. Graham, not only for helping me, but for taking time to help various members of my IMBA class jump-start the thesis with voluntarily hosting a summer thesis class. Dr. Graham was available at all times and always gave a prompt and encouraging “straight-to-the-point” response. Dr. Farinella, thanks for “keeping it real” with me. Dr. Farinella certainly had to separate the realistic from the unrealistic approaches to finishing the thesis. I put hours of reviewing literature to find some viable direction, and Dr. Farinella was not afraid to let me know where things were going right and wrong. Dr. Porterfield, was unquestionably an essential member to have on the advisory committee, because of her long-during support throughout undergrad and graduate school, her experience with graduate projects and her influence. Dr. Pete Schuhmann was always an unofficial committee member due to his contributions to the statistical portion of the thesis. Even though it ended up not working out, Dr. Schuhmann was even willing to meet me right around Christmas time to help me along. Thank you committee!

I must thank my girlfriend Leeanne for hanging in there with me. She was there with me during all the long-during hours of required silence and mental strain. She never gave me any trouble for the delays and the occasional inefficient uses of time. She had no problem with leaving me alone during the studies and finding other activities to allow me time for concentration while we shared various small apartments during a time of almost constant transition.

Thank you mom and dad for your continuous support!
Thank you Dr. Sackley, Anne and Mrs. Barnhill for being around in the summer of 2008 and making available CIS building and the Bloomberg facilities.

And thank goodness for it being done!! Bring it CFA.
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A. INTRODUCTION

Many theories would suggest that the effects of a recession in a certain economy, such as that of the United States, would bleed into other correlated economies and markets. In other words, the perils the United States has had to face in recent months are likely to also have an adverse impact on countries closely correlated to the United States. One of the catalysts to the current economic condition of the United States pertain to the systematic defaulting of sub-prime borrowers due to an increase in interest rates; which in effect, has led to the decline of value of many securities and funds vested in these securitized mortgage loans. The United States is currently sorting through the implications of this chain reaction. But, how many of these asset-backed securities have infiltrated markets in Europe? How have investors in the United States and Europe reacted to the declining values of their real estate investments? The purpose of this thesis is to compare the patterns of market sentiment in real estate markets in Europe and in the United States. The research question that this thesis will answer is: Does market sentiment in real estate markets manifest itself in similar ways in the US and in the EU?

A secondary research question that will be addressed is: How is market sentiment in the real estate markets of the EU and Europe affected by macroeconomic variables, such as interest rates, inflation rates and exchange rates?

In order to measure market sentiment, studies must be focused primarily on noise traders (irrational investors). The existence and effects of noise traders are to be measured using REIT bid-ask rate spreads from both the United States and the EU, using both specific property type and diversified REITS.

In this study, findings will be drawn from three differing, but credible sources in order to provide a dynamic perspective on international real estate. Extant literature is used as a base of existing knowledge and as a guide to further supplement the available realm of international real estate information. Connections will also be drawn and discussed between varying theories associated with international real estate. News articles from respected sources of current information such as Business Week, the Economist, the Financial Times, and the Wall Street Journal will provide information on the relevant subject more current than is possible with academic journals alone. Finally raw data gathered from Bloomberg on the performance of over 300 REITs, on interest rates, exchange rates and other variables produced findings to further supplement the body of information gathered.
B. EXTANT LITERATURE

The extant literature section of the thesis addresses five separate sections: A General Look Into International Real Estate, An Explanation of Real Estate Investment Trusts, Players in Real Estate Investment Trust Markets, Types of Real Estate Investment Trusts and Considerations, and The Sub-prime Crisis and Its Effects on REITs.

1. International Real Estate in General

1.1 Portfolio Theory and International Real Estate Investments

Portfolio diversification benefits can be achieved in real estate investment in two effective ways: diversifying across property types and across geographic regions. To review, true diversification can best be attained by diversifying across assets with low correlations. In other words, the different investments types should not follow the same market trends. Different forms of international real estate have been found to have low correlations with other investment types; and thus, adds value to a well-diversified portfolio. Worzala and Sirmans (2003) find that portfolio performance improves as international real estate is added to the portfolio. In comparison to stocks, Worzala and Sirmans (2003) find that investing in international real estate-related securities provides additional diversification benefits over and above that associated with international stocks.

A distinction needs to be made between securitized real estate, such as Real Estate Investment Trusts, and direct real estate. Worzala and Sirmans (2003) find empirical evidence in support of the inclusion of international securitized real estate investments. They found that, even though studies on international real estate “use a number of different return series and countries, the conclusions are almost unanimous in indicating that an international real estate stock investment strategy provides diversification benefits. That is, efficient portfolios that include international real estate stocks in the opportunity set for a mean-variance analysis outperform those that do not (Worzala and Sirmans, 2003).”

Worzala and Sirmans (2003) compared the risk-return attributes for the US investor for a portfolio with and without international real estate. They find that the maximum return for a US investor without foreign real estate is 1.88 per cent with a standard deviation of 8.57 per cent (standard deviation being a measure of portfolio risk). If international stock and real estate are added to the portfolio, the risk in the portfolio falls to 5.73 per cent for the same return level. The
inclusion of real estate, direct or indirect, improves portfolio risk-return attributes. In the following section, further detail is provided to analyze the addition of international real estate.

1.2 Effects of the Inclusion of International Real Estate into a Diversified Portfolio

As mentioned, one effective method for considering the benefits of an asset class into a portfolio is to look at the risk-return relationship of the relevant asset class. Asabere et al. (1991) analyzes the risk-return attributes of international real estate equities using a variety of different indexes. His findings indicate that international real estate equities outperform domestic real estate companies on a risk-adjusted basis. On top of diversifying by real estate, investors must include international real estate to gain true international diversification benefits.

International real estate enjoys exceptionally low correlations with other assets classes. Due to low cross-correlations with stocks and bonds, adding real estate can reduce a portfolio’s risk without destroying its expected return. Brounen, Op ’t Veld, and Raitio (2007) find that adding international real estate securities to a U.S. mixed-asset portfolio yields significant risk-return benefits, by improving the efficient frontier.

Other added values derived from the inclusion of real estate in a portfolio vary in implication. Hoesli and Lekander (2008) offer a considerable adjunctive provided by the addition of international real estate. The long duration of property assets, in combination with the common contractual tie of rents to the rate of inflation offers a match to long-term liabilities. Property offers high risk-adjusted returns, in part due to the liquidity premium. Many of these added features may be attractive to more conservative investors, but often avert aggressive investors.

Some drawbacks to investing in real estate include the lumpiness of assets, information asymmetries and barriers to entry. Building values tend to be large and properties are by nature indivisible, the seller of an asset generally has an information advantage over the buyer and substantial capital is needed in order to invest in property without being exposed to too much asset specific risk (Hoesli and Lekander, 2008). These real estate concerns have been circumvented by the innovation of new securities that take many forms. A straight-forward example is securitized real estate, in which asset specific-risk and capital requirements can be shared with other investors. The investment vehicle, the REIT share, which will be the primary
proxy for real estate market behavior used in this composition, is a form of securitized real estate that has exceeded other real estate investment structures in functionality and popularity.

1.3 Global Convergence, Increasing Asset Correlations, and other Contrary Findings

One of the benefits to investing in securitized real estate is that it is still relatively early in its evolutionary process. Stocks and other asset classes have existed far longer than securitized real estate and are following a trend of global convergence in which correlations between countries are strengthening. Lizieri et al. (2002) finds that real estate stocks are much less correlated across Europe than stocks in general. Also, real estate stocks have not converged as rapidly as general stocks as the European Monetary Union was commenced in 1999. Thus, property markets are not subject to the same convergence forces that are evident in capital markets. However, with central banks and governments in Europe working together to impose uniform tax and exchange legislation, real estate convergence will likely follow in the footsteps of other securities.

One important observation and consideration by Kleiman, Payne and Sahu (2002) is that results from co-integration analyses and vector error correction models suggest that diversification benefits through international real estate securities can only be achieved in the short run. Their findings also suggest that Europe and North America are co-integrated. The latter observation is more obvious now than ever, because real estate markets and the current recession have followed a trend starting in the United States and are now taking effect in most of the European markets and Asian markets, as a consequence of market integration. Tests run on REIT spreads in the US and Europe will focus in on similar macroeconomic and market stimuli similarities.

International real estate is not immune from global integration. “The correlation coefficients between international direct property markets increase over time, theoretically reducing the benefits of international diversification” (Eichholtz, 1996). Securitized real estate is a liquid tradable representation of direct real estate, perhaps suggesting it will follow the same globalizing pattern as direct real estate.
1.4 Conditions for Achieving Benefits from International Real Estate Investing

Due, in part, to the heterogeneous nature of real estate, local market competence is an important necessity in real estate investing. The best real estate decisions can be attained only by directly or indirectly consulting local experts. Eichholtz et al. (1997) find that the domestically-focused firms outperform the internationally diversified firms from 1983 to 1995 with domestic firms producing average returns of 14.1 over cent compared with 7.7 per cent for international firms. These results suggest that the domestic firms may have an information advantage over the international firms. The authors conclude that direct international investment gives a lower risk-adjusted return than indirect international real estate investment. They attribute the lower performance to the increased information costs of establishing contracts, obtaining information and overcoming barriers to making global investments. Even though both direct and indirect real estate have distinct advantages and disadvantages, securitized real estate funds achieve better risk-adjusted returns.

The establishment of indices and the growth of international service providers throughout Europe add transparency and expectations of increasing sophistication. These factors are standardizing the trading facilities for asset classes and leading to lower correlations between international investment vehicles. The international diversification gains for real estate stem from the local nature of the assets as the income and the market valuation of an asset largely depend on its attractiveness as well as the local economy. Thus, despite the fact that the capital is becoming more international also in the real estate sector, the return generating function of the assets remains very much tied to the local economy (Hoesli and Lekander, 2008). In this way, the regional diversification benefits associated with real estate will not soon cease to add value as correlations remain low.

Real estate necessitates the use of hedging strategies to control for exchange rate fluctuations. If hedging strategies are not pursued, some of the returns from real estate holdings may not be directly attributable to capital gains. Worzala and Sirmans (2003) find that investing in international real estate securities provides diversification benefits. The exchange rate risk accounts for a sizable return of the volatility and conclude that investors should consider hedging strategies if they take on an international investment strategy. According to findings by Worzala and Sirmans (2003), real estate plays a key role in minimizing portfolio risk. Exchange rate influence on real estate investing will be further detailed in section four.
2. An Explanation of Real Estate Investment Trusts

There are many forms of international real estate assets of which many will receive a characteristic overview within this thesis. Primary emphasis will be placed on REITs, which are becoming an increasingly common form of listed, securitized real estate. Findings as to the benefits of the inclusion of REITs in a diversified portfolio are outlined. To gain an understanding of REITs, there will be a comparison to other real estate investments forms and structures. Afterwards, REIT trends will be reviewed, which will prove to align closely to real estate trends in general. Finally, a literary review of the introduction of REITs to Europe will receive attention as this relates to the data analysis portion of the thesis.

2.1 REITs defined

Real Estate Investment Trusts are real estate investment companies that benefit from maintaining an investment structure composed of a certain significant proportion in securitized real estate. REITs in the US and increasingly in Europe and Asia are granted tax benefits if they keep a certain minimum proportion of the investment company vested in real estate. In the United States, for example, a REIT must have at least 90% of its assets in real estate to benefit from tax exemption. Another distinctive quality of a REIT company is the fact that a significant proportion of income must be distributed to shareholders.

“Many factors have contributed to the growth of REIT initial and secondary public offerings, including changes in capital requirements for commercial lenders making mortgages more costly, and changes in tax laws reducing the favored status of other forms of ownership” (Capozza, Lee, 1996). Total REIT market capitalization has witnessed unsurpassed growth in the United States, Europe and Asia; and thus, daily trading volumes trends on REIT exchanges in the US and Europe are behaving increasingly similar to trading patterns of small- and medium-cap stock markets.

Europe’s differing national governments have also caught onto the benefits of REIT-like structures. Since the late 1980s, Europe’s stock exchanges have supported the trading of REITs. Until the third quarter 2007, the average European REIT underwent significant growth since its inception. However, since the global real estate market collapse, almost all REIT share prices have also suffered price drops.
Europe’s national governments have imposed differing legislation upon the trading of REITs, clarifying stipulations, such as; what constitutes a REIT and what are the benefits of maintaining REIT status. However, the central banks of Europe are increasingly turning over their REIT policy jurisdiction to the European Central bank.

REIT’s return on investment, similar to other forms of real estate investment, consists of rental income and capital gains. “Net Operating Income (NOI) or property income for each REIT is defined to be the income before interest, depreciation, and overhead expenses (general and administrative costs) and is calculated by taking rental income minus property taxes (property taxes, property management expenses, etc)” (Capozza, Lee, 1996). Below, is a simple calculation that is used to find the net asset value of a REIT share.

\[
\text{NAV} = \frac{\text{Market Value of the Properties} + \text{other assets} - \text{total liabilities}}{\text{Number of Shares Outstanding}}
\]

Figure 1: REIT NAV Calculation Formula

Varying factors can divert the net asset value of a REIT share from its true appraisal value. For example, appraisal smoothing, in which appraisers use simple accrual and forecasting techniques to determine the values of properties without actually examining the property itself will falsely smoothen the underlying value of a REIT fund. In addition, market sentiment, which will be discussed in more detail in section 3.2, can also inadvertently throw-off the true value of property shares. The latter has influence over indirect property, such as securitized real estate, significantly more than direct property.

2.2 Why REITs?

Not only have REITs gained in popularity due to their favorable tax advantages and for providing a solution to diversify by international real estate without the capital obligations inherent to direct real estate investment, but academic studies have shown they provide significant portfolio diversification benefits. As Worzala and Sirmans (2002) describe, “Given the difficulties of buying direct real estate, many researchers have advocated an investment strategy that uses ‘indirect’ real estate investments, sometimes called property securities (in the US typically proxied by REITs), as the real estate asset class in an investment portfolio.” REITs provide a solution for some of the draw-backs associated with direct real estate, such as capital
obligation, asset heterogeneity and illiquidity. Along with these reasons, an investor can expect to receive a steady rental income from REITs in the form of a dividend.

Studies examining the risk of REIT versus other asset benchmarks have found that REITs have relatively strong risk-return attributes. Asabere (1991) finds that Jensen’s alpha measure for REITs is both positive and statistically significant (t=2.25). The world real estate index has higher values for both Treynor’s measure and Jensen’s Abnormal Performance Index than either equity index (Asabere, 1991).

Some researchers advocate substantial proportions of an efficient portfolio being allocated to REITs. Asabere et al. (1992) find that the optimal portfolio would have 0.6 per cent in international real estate companies and 40 per cent in US REITs. Asabere’s findings may need to be revised considering the turn of events in recent months.

Different asset-classes in a portfolio serve functions beyond simply achieving higher earning at a constant risk-level. For example, certain assets may act as a hedge against inflation for a diversified portfolio. Hamelink et al. (1997) focus on inflation hedging and find that REITs are the best inflation hedge in the US but in the UK it is common stock investments. In this case, the inclusion of REIT shares to serve as a secondary function is more useful for portfolios in some countries than others.

Similar securitized real estate structures, such as real estate operating companies, suffer from taxation issues as the companies and investors are required to pay corporate taxes and value added taxes. Hoesli and Lekander (2008) detail that the establishment of REIT-type structures addresses the issue of tax efficiency, while continuing to offer investors the benefit of lessening information asymmetry problems for unknown markets, increasing the potential for liquidity, and diminishing the operational risks of implementing international real estate strategies.

Offering an easier and more attractive real estate package and subjecting it to public trading media comes with its drawbacks. Public real estate tends to be more highly correlated with the stock market than with the direct real estate market, partially because there is more influence from noise traders and market sentiment, which is at the expense of diversification benefits. Furthermore, listed real estate tends to be more volatile than direct investments due to the fact that listed securities are traded daily. Also, the price of real estate securities regularly deviates from the NAV. The short-term valuation of listed real estate is subject to relative sector
views on the stock market, and less to the valuation of the underlying assets (Hoesli and Lekander, 2008).

A portfolio manager David Lee from T. Rowe Price (Business Week, Sep. 12, 2002) outlines some more benefits associated with REIT ownership. Lee explains that while REITs themselves typically do not deliver huge returns, they can provide a cushion in a declining market environment with their high dividend yields. These dividend yields are a direct result of real estate’s rental income. Furthermore, Lee makes a statement regarding real estate in general saying that fundamentals in the real estate industry are actually weakening, REITs are not immune to the downturn in the overall economy, but they can provide a bit of a buffer from a weak economy.

2.3 REITs and Other Real Estate Investment Forms

Many differences are apparent between direct property ownership and trading real estate shares. For example, Wilson and Okunev (1999) find that the pronounced cycles often found in direct real estate markets are not evident in the real estate stock and general stock markets. They also find relatively weak evidence of co-cycles between the real estate stock and general stock markets. In other words, a low correlation exists between direct real estate and real estate shares, and also between real estate shares and the general stock market. It can be interpreted that the correlation between direct property ownership and the general stocks market is especially low.

Real estate is experiencing a wave of change. Technology is shifting the investor’s inclination from managing their own portfolios toward outsourcing necessary knowledge and risk. The evolution of investment vehicles is simplifying asset management and providing a great number of resources to investors. More and more investors are using third party managers or indirect vehicles to achieve well balanced domestic and international property exposures. These new avenues include outsourcing of the management of assets, the growth of the non-listed property fund industry, the establishment of REIT-like structures in an increasing number of countries and the creation of a derivatives market (Hoesli and Lekander, 2008). These new investing methods are reinforcing the preference for investing in REITs along with other indirect property instruments. Investing in REITs is an easy way to add domestic and international property exposure to an efficient portfolio.
2.4 Securitized versus Direct Real Estate

Institutional investors have been increasing their interest in real estate and have started using publicly listed real estate as a cost-efficient, more liquid alternative for their direct real estate holdings. At the same time, many of these investors remain concerned about the degree to which publicly listed real estate companies reflect real estate attributes, like low volatility. REITs, being public in nature, are exposed to many subjective market movements as a result of speculation and other divertive stimuli.

In the long-run, securitized real estate enjoys some of the benefits of liquidity, while retaining some of the qualities of direct real estate, such as low correlations to other asset classes. Brounen, Op ‘t Veld and Raitio (2007) make a distinction between listed and non-listed real estate by explaining the effects of securitizing real estate. Securitizing property leads it to behave like other securitized assets, such as small-cap stocks. The securitized wrapper of public investment vehicles introduces a low-cost, trading market dimension that is not present in the unsecuritized real estate market. Although when adjusting for property type composition, leverage, and appraisal smoothing, public and private real estate are tracking closer in the long run. Fluctuations in stock market sentiment still weaken contemporaneous correlations between both markets. Real estate assets tend to keep their distinctive qualities even after securitization. The cost of obtaining real estate security liquidity and capital affordability is exposure to unjustified market movements. In the data analysis section, the relationship and effects of market sentiment on real estate financial markets is measured to give an idea of the degree of subjective market movements.

2.5 Real Estate Fund Trends

There are some signs that the REIT market is becoming more closely related to the direct real estate market, hence they are positively correlated. It is reported that the REIT market went from being influenced by similar economic stimuli that influence large-cap stocks during the 1970s and 1980s, to following behavior patterns that resemble those of small-cap stocks and securitized real estate asset classes in the 1990s. In the long term, the resemblance between securitized real estate and direct property markets increase substantially. This would indicate that the valuation of listed assets over time approaches the fundamental valuation, which is amply supported by the academic literature (Hoesli and Lekander, 2008). This evidence does support
using REITs as an alternative to direct real estate investments, especially in the long run. Short-term deviations in REIT shares’ true value corrects itself over time to the underlying value of the properties in which the REITs are vested.

With this in mind, it is not surprising that there is growing evidence that holdings have become increasingly indirect. Companies are selling off some of their traditional assets and receiving in exchange shares of newly created investment vehicles. Now an investor can achieve liquidity with retained diversification. This is possible by combining direct holdings on markets where information asymmetries can be managed with a niche private fund investments for specific markets or sectors (Hoesli and Lekander, 2008). In this respect, it is possible to own liquid shares in small amounts while enjoying the benefits of local real estate expertise.

As mentioned, each of the EU countries have varying regulations on the structure and tax benefits of REITs. The European Union, in line with other trade and security integration, is now unifying its policies on REIT policies to grow its market capitalization and bring more liquidity to securitized real estate markets. As the Financial Times (April 22, 2008) reports, promoters of the real estate industry have been quietly lobbying the European Union to consider plans for what they call the EU REIT, a cross-border real estate investment company structure that would make similar tax advantages to the respective national jurisdictions. The EU is already consulting on proposals for cross-border open-ended real estate funds, making it a short leap to consider similar close-ended investment alternatives. It may be in the EU’s favor to allow such structures as other large and growing continental REIT markets may manipulate European investors’ preference for their portfolio real estate holdings. With the large US and Australian REITs on the lookout for international takeover targets, it is advisable to push for REIT economies of scale in Europe to bolster competitiveness. Most large EU members already have some form of REIT legislation, although considerable differences exist across the continent; particularly concerning operational and leverage restrictions and whether stock market listing is mandatory.

The EU REIT would provide fairer competition across Europe, as well as enhanced market security and stability. A European regime would have the additional advantage of allowing better access for savers in small member states to property investments as well as opening up the potential shareholder base among retail investors across member states (Financial Times, April 22, 2008). Harmonizing REIT legislation is therefore in Europe’s best interest and will further facilitate European REIT evolution.
2.6 The Emergence of REITs in Europe

REITs were originally introduced in the United States in 1960. Nine years afterwards, the concept of the REIT-like structure made its way to Europe. The establishment of tax-efficient, REIT-type regimes was introduced by the Netherlands in 1969, and other countries in Central and Southern Europe have been early adopters. The many mentioned favorable properties of REITs have made it a popular investment vehicle. The introduction of REITs has in all cases led to a surge in real estate listings in these countries. Tax-efficient vehicles are seen as an important tool for stimulating the growth and development of a listed real estate investment market. The establishment of a liquid and transparent real estate equity investment class provides access for small investors to participate in commercial property, which are characterized by stable rental returns and predictable distribution returns. The likely introduction of real estate investment trust regimes in Britain and Germany over the coming year represent landmark events in the European real estate market, as they are by far, two of the largest markets in Europe (Business Week, April 24, 2006). Most European countries now market a wide array of diversified or property-specific REITs traded on Europe’s stock exchanges.

Many REITs have been initiated and those that have, on average, have grown in market capitalization and therefore benefited the shareholders. REIT prices started dropping with news of real estate troubles in the United States, which further reinforces evidence of the continual gap between net asset value and share prices. The way real estate is securitized and listed leaves REITs vulnerable to diverting from their underlying values. As a matter of fact, the prices at which shares of REITs are traded rarely represent the NAV of the underlying properties. For example, UK REITs have followed a pattern which aligns with the general stocks markets. In the spring of 2007, UK REITs were trading at 10 percent premiums to their net asset value backing (NAV), which is still the “plimsoll line” for pricing property shares given the low dividend yield characteristics of 3 to 4 percent. The value now appears to be swinging back in favor of REITs on 25 per cent discounts to NAV, a price that is factoring in a lot of balance sheet impairment (Financial Times, September 26, 2007). Depending on the health of the real estate sector, listed REITs in the UK, as well those of all other REIT-endorsing nations, will have share prices fluctuating above and below the net asset values of the underlying assets.
Before the onset of the real estate slump, property share liquidity was enhanced, with trading volumes running at nearly twice that of 2006. Sector ownership also broadened, having been dominated by domestic funds, most of which are indexed. European ownership of the real estate sector is now 81 percent, US property funds have risen to 12 percent and Asian funds 4 percent with African funds at 3 percent (Financial Times, September 26, 2007). The average portfolio’s real estate holdings are increasingly international as the benefits of international diversification are explored.

3. Players in Real Estate Markets

As explained, REITs are exposed to the same variables that cause fluctuations in the prices of stocks in the general stock markets. One of those variables affecting the prices on the stock markets are the types of investors which are holding shares. One definite distinction must be made: the private investor versus the institutional investor. This section will focus on the differences between institutional and private investors and further explain how a certain sub-category of private investors, of which many are noise traders, throw off the prices of stocks by being subjected to market sentiment.

3.1 Irrational and Institutional Traders

Institutional investors are trained specialists usually employed by professional financial institutions. They trade based on technical and fundamental analysis and regularly stay on top of the latest news in their area of expertise. Their analysis therefore, strives to find the underlying values of investment vehicles in an attempt to uncover structurally-sound opportunities. Noise traders, on the other hand, are usually private investors that have less experience and know-how as the institutional investor and base their trading decisions on biased and subjective streams of information. Noise traders are also known as irrational investors because they often neglect to follow even the most basic principles of investing, such as, buy low and sell high. Irrational investors are known to cause undue volatility which can lead to bubbles and crashes in the financial markets.

Initially, the belief was that an investor trading on anything but fundamentals would fall prey to rational arbitrageurs and be forced out of the market. However, noise traders are now deemed to provide a healthy contribution to financial markets. The theories of Black (1986) and
Trueman (1988) suggest that noise trading will persist because it plays an important role in providing liquidity, particularly in the riskier assets (e.g., stocks). Since REITs behave similar to small cap stocks, they can also be considered a risky asset, and hence noise traders also play an important part in providing liquidity to REIT markets.

The DSSW model provides a comprehensive explanation of the phenomena of noise traders and market sentiment. The DSSW noise-trader model (1990a) assumes two types of investors—those that trade on fundamentals only and those that trade (sympathetically) on some noisy signal. These noise traders affect the level of asset prices by trading when they are unusually bullish or bearish. If the noise traders act in concert, their trading may cause prices to deviate from fundamental values. Because arbitrage is now risky (i.e., deviations from fundamentals could increase), rational traders choose not to fully restore to their fundamentals-based levels. Consequently, noise traders are an additional source of systematic risk that is reflected in market prices. This risk should manifest itself as added price volatility of assets affected by the actions of noise traders. Extreme levels of sentiment (in either a bullish or bearish direction) should be associated with increased noise trading, consequently, increased volatility in closed-end fund prices. Noise traders can significantly affect any financial market. When noise traders react in unison on biased positive or negative media, they have the capacity to bring up or down the markets. Noise trader swings are associated collectively with market sentiment. Market sentiment may have contributed to the recent real estate slump.

Noise traders do have their purpose in financial markets. On the upside of assets subject to noise trader risk will earn a higher expected return than assets not subject to such risk. Relative to their fundamental values, these assets will be underpriced (Lee, Shleifer and Thaler, 1991). The trading behavior portrayed by noise traders affects share values in a way that the trading price is below the NAV.

3.2 Market Sentiment

Noise traders have a large impact on exacerbating the effects of market fear or confidence. Noise traders create excess volatility and thus cause market peaks and troughs to overshoot, or go beyond their true underlying values. The volatility fluctuations above and below the NAV of the underlying assets can be attributed to market sentiment. Brown (1999) wrote on the implications of noise traders and market sentiment. Irrational investors acting coherently on a
noisy signal can cause systematic risk. If noise traders affect prices, the noisy signal is sentiment, and the risk they cause is volatility, then sentiment should be correlated with volatility. Brown finds unusual levels of individual investor sentiment are associated with greater volatility of closed-end investment funds. This volatility occurs only when the market is open and is associated with heightened trading activity. The principles of portfolio theory state that volatility is risk, but as has been established, the existence of noise traders also increases the expected return of the markets in which they participate.

The volatility associated with sentiment is even stronger during open-market periods and is virtually nonexistent in closed-market periods. These results strongly support the noise-trader theory. Small-term investors are more likely to be trading when sentiment is extreme. Trading volume is not affected by sentiment (Brown, 1999). Large trading volumes usually fall within the capacity of institutional traders.

When trading volume is referred to, there is a difference between total trading volume and trading frequency. Institutional investors handle large chunks of investment media while private investors buy and sell smaller portions of stock at a higher frequency. Apparently, when sentiment is unusually bullish or bearish, noise traders do not enter the market in addition to larger (presumably, fundamentals-based) traders. Larger traders actually give way, to some degree, to noise traders. Number of trades increases, but trading volume is essentially unchanged (Brown, 1999). In other words, when financial markets reach peaks and troughs, institutional investors wait for the markets to stabilize while noise traders contend for groundless gains.

3.3 Measurement Methodologies of Market Sentiment

There are multiple accurate methods for measuring market sentiment. Bandopadhyaya (2007) claims one of the more accurate ways to measure market sentiment is by looking at put-call ratios, assuming that a low PCR is an indicator of strong market conditions and vice versa. This is logical, since a call option allows investors to make virtually limitless gains, while protected against the chance of a market slump. Contrarily, traders can also trade on the assumption that the value of a specific security will decline using a put option due, while being protecting from an unexpected upswing. When markets are expected to fare well, investors seek call options, while predictions of a market slump compel investors in the direction of put options.
Another means by which to measure market sentiment is to compare the price of a share of a closed-end fund to the value of the underlying assets. Positive market sentiment exists when closed-end funds trade above the true value of their underlying assets, and vice versa. Closed-end funds are known to follow predictable patterns of swaying above and below the underlying values of the assets in the fund. Similar techniques can be applied to REITs, since shares represent the underlying values of the properties within these REITs.

One method for measuring market sentiment specific to real estate markets is by comparing the prices at which properties are listed and the prices at which they finally end up being sold. During times of real estate market strife there is a larger gap between the list price and selling price of real estate. Collecting this form of data is difficult, since selling prices are not always publicly listed. This method of measuring market sentiment is also limited to direct real estate and may not serve as an accurate reflection of securitized real estate markets.

In this composition, the chosen method for measuring market sentiment is by examining the bid-ask spreads of European and American REITs. The bid and offer prices are the prices at which assets can be bought and sold from financial intermediaries. The spread between the bid and the ask price essentially constitute the earnings by a financial institution. When fear exists that assets may lose in value or when there are threats of declining liquidity, financial institutions expect to be able to sell assets at higher prices than they are willing to pay. The spread is a premium banks expect to cover liquidity and capital decrease risks. The difference between the bid and ask prices therefore increases. A larger spread insinuates that traders are experiencing negative affect about the relevant financial markets, while slim spreads are signs that markets are behaving healthily and liquidity risk is limited.

3.4 REITs and Market Sentiment

The extant literature on REITs and market sentiment is limited at best. Lin, Rahman and Yung (2008) examine how REIT returns react to market sentiment. They found that when investors are optimistic (pessimistic), REIT returns become higher (lower). Also, examination of REITs based on size reveals that the return generating process of small REITs differs from that of mid-size and large REITs. Similar to differences in large and small cap stocks, the trading parties vary per REIT-size and so do the REIT returns.
Although REITS have a closed-end nature, they are significantly different from closed-end funds. The underlying assets of closed-end funds are financial while those of REITs are of real estate. The net asset value of closed-end funds can be determined accurately but it is much more difficult to accurately measure the net asset value of REITs. The valuation of REIT NAV is largely dependent on appraisal valuation, which requires the experts to make a physical analysis of the properties in question. There is similarity however, between closed-end funds and REITs in that market capitalization of both is generally less than the net asset value of the underlying assets. Investor sentiment (noise trader) risk is not diminishing as there is more institutional ownership of REITs. If high institutional ownership does not eliminate noise trader risk, REITs are more vulnerable to market sentiment than closed-end funds.

4. Types of Real Estate Investment Trusts and Considerations

The purpose of section four is to provide more detailed considerations relevant to REITs. Emphasis is placed on how property types relate to REITs and what kinds of REITs exist. Furthermore, this section outlines how exchange rates play into REIT investing. The desired effect of this section is for the reader to gain a cohesive overview, so the functionality of REITs as a proxy for real estate markets can be justified. As a general understanding of REITs and supplemental concepts is realized the subsequent section of the current real estate market condition will be outlined and put in perspective with an analysis of REIT data in the data analysis section.

4.1 On Property Types

Research suggests that real estate achieves better diversification benefits from international diversification by region than through property types. Regional differences in real estate accounts for return variations more so than property types. Eichholtz (1997b) concludes that regional diversification is more beneficial than property type. Property types may still serve as a significant source of diversification benefits in real estate and a combination of international diversification and diversification by property will maximize the efficiency of the real estate holdings in a portfolio.
Research indicates that the optimal allocation among categories of real estate, i.e., between farmland, residential real estate, and business real estate, varies over different time periods. This suggests that different categories of real estate are affected by different macroeconomic factors. The highest risk-adjusted return characteristics are achieved by differing property types over time. There is one property type with superior returns over the other property types, residential property. Eichholtz (1997b) finds that residential property shows the highest returns, the lowest volatility and relatively low correlation coefficients with other property types, indicating that it is best for gaining diversification benefits by property type.

The Wall Street Journal is capable of providing a recent account on which property types are leading the way in the early stages of the housing slump in Europe. Unibail is one of Europe’s larger real estate investment companies and recently diversified its own operations through the acquisition of another large property investment group. Unibail, specializing in office property, bought Rodamco, specializing in retail property, to avoid excess risk exposure from the office market. European office property is considered much more vulnerable to an economic downturn than retail. Malls, shopping centers and other large-scale retail properties in Europe have been able to maintain high occupancy rates even through down cycles because building restrictions have limited competition. Office tenants, in the meanwhile, have been more likely to relocate on shorter notice because of events like restructurings, outsourcings or mergers (Wall Street Journal, April 30, 2008). The Wall Street Journal is suggesting that retail properties have a higher tolerance to a recession, because a recession does not affect the importance of location to retail outlets.

The effects of the real estate slump varies per property type and per country. Commercial properties, which includes retail as well as office property has taken a hit as properties in general has been overpriced in Europe. The Financial Times (June 14, 2008) explains some of the repercussions of overpriced commercial property. The net result has not been disappointing. Yields have been falling in countries such as France, Germany and Italy as property prices rose fast. But the recent jump in yields signals that capital values are starting to fall back. Some Western European markets, such as German retail space and Paris offices, generated total returns of 10 per cent-plus last year, while the UK market was rapidly slowing (The Financial Times, June 14, 2008). Fund managers say some of the rapidly-growing areas may now be overpriced. European prices have generally not risen as much as in the UK. Also, many European
commercial property leases benefit from automatic annual rent increases, although there could be more resistance to these as growth slows during bearish circumstances. While capital is experiencing negative growth, the regular rental income increases offsets the losses. Prices from the “EU 15”, which includes the UK, are expected to fall by an average of 6 per cent, while rents could grow by a similar level, resulting in a neutral total return (The Financial Times, June 14, 2008). Even though returns from property investment have remained neutral, properties in Eastern Europe are believed to continue increasing in value. Fund managers still looking for opportunities in Europe are hunting development opportunities in the east or heading to the Scandinavian countries, which have been more stable.

4.2 Types of REITs

A wide array of property types exists in Europe. Even though most REITs are diversified by property type, there are numerous REITs to act as a proxy for each of the property types. Different REIT types exemplify different behaviors as a result of market conditions. Capozza and Lee (1996) detail some differences between different REIT types by explaining general patterns of the price of REIT shares compared to the underlying assets. “Warehouse REITs are discounted the most heavily while retail REITs are discounted least. Retail REITs are significantly more focused by property type and carry significantly less overhead expenses” (Capozza and Lee, 1996). The findings support investment into retail-based REITs, but warehouse REITs are the biggest bargain selling for less than a third of the value of the underlying assets.

Results from Capozza and Lee (1996) help to explain why retail property is over represented and warehouse/industrial is under-represented in REITs. Retail property, once securitized, often sells at a premium while the opposite is the case for warehouse/industrial property. Therefore, securitization adds value to retail property but destroys value for warehouse/industrial property.

Another distinction is necessary between small and large REITs. Small REITs (fourth quartile) are discounted 33% more than large REITs. Large REITs are more highly leveraged than small REITs (capozza and Lee, 1996). Small REITs are twice as costly to administer as large REITs. Investors pay more management fees and transaction costs to buy, sell and hold small REITs. This may account for some of the large discount from net asset value for small
REITs. Since small REITs have lower financial risk (less leverage) and less local market risk (more diversified by region), one might expect lower cash flow yields. In all, highly discounted categories are also categories with high expense ratios (Capozza, Lee, 1996). Depending on the intention of the investor, small and large REITs provide different benefits. While small REITs have a better value and are less risky, large REITs earn higher cash flow yields, such as rental income or dividend pay-outs.

4.3 Diversification by Region

It has already been stressed that regional diversification is more effective than diversification by property type. This holds true for at least two significant reasons: the heterogeneous nature of real estate is lowered by focusing on a regional basis and because correlation coefficients are lower by region than they are by property type. Asabere (1991) finds that international real estate is not a homogeneous asset category. The lease terms, indexation provisions, and tenant obligations differ from country to country. Whether considering commercial or residential property, real estate arrangements vary by law and norms in all countries.

Regional diversification is not limited to individual countries, as real estate portfolios benefit to a greater degree from diversifying by continent. Eichholtz et al. (1993) examined indirect real estate shares for 12 countries and 3 continents from 1985 and 1990 looking for evidence of a common factor across continents. Results indicate that a continental factor for the European and North American property markets exists, but not for Japan. Most investors need to consider investments across continents for optimal international diversification.

Another method for optimizing diversification is by segmenting real estate portfolios into developed and developing units. Barry et al. (1996) find that the minimum variance portfolio for holding both developed and emerging market real estate is achieved with an 11 per cent allocation to real estate in emerging markets. The allotment to emerging market real estate holdings should be marginal to increase return while keeping risk constant.

When investing in REITs, it is recommended to hold REITs from different countries, because of the low REIT correlations between countries. Eichholtz and Koedijk (1996b) find from real estate securities from 25 different countries that correlation coefficients are relatively low when US REITs are compared with the different international markets. When regional
property companies are analyzed, regions do offer relatively low correlation coefficients. Diversification into international real estate stocks should provide positive portfolio implications.

Both diversification by region and by property type reduce idiosyncratic risk. Asabere (1991) finds that diversification across geographic areas or property types will reduce the unsystematic risk of the real estate portfolio, since different regions and property types are weakly correlated. A combination of investing in real estate in different countries and of different property types provides the optimal portfolio solution.

One of the most emphasized aspects of international real estate investing is the influence of exchange rates on risk and return. Wilson and Okunev (1996) conducted tests that favor international property stock segmentation, but they comment that the potential gains were dependent on the exchange rate risk. Currency fluctuations do not follow the same trends as does real estate, and therefore must be controlled for. The following section explains the significance of foreign exchange rates to real estate investing.

4.4 How Exchange Rates Play into REIT Markets

Most research on REITs has one aspect in common, the importance of hedging exchange rate risk. Exchange rates are also a false source of increased expected return of international REITs and do also increase risk in the form of exchange rate risk. Stevenson (1999) finds evidence that incorporating currency into the analysis increases risk but not to significant levels although international real estate falls out of the efficient portfolios. Exchange rate risk must be moderated using hedging strategies to enjoy the diversification benefits of real estate.

Exchange rate risk is a significant consideration in the short-term, but subsides in the long-term. A long-term holding-period for real estate might mean minimal currency risk for the investor, particularly for mixed-asset portfolios with other international investments (Conner, 1999. Frequent traders should be cognizant of currency risk and may find employing currency forwards or futures beneficial in real estate trading.

Currency risk is not the greatest risk faced by international real estate investments. The greatest amount on risk still stems from the asset itself. Stevenson decomposes the currency and real estate risk and, in all countries, the greatest degree of risk is from the asset, then the currency and finally covariance of the two (Stevenson, 2000). The view on whether currency volatility is a source of risk worth hedging remains in question.
4.5 International Real Estate Risks

Certain risks exist in international real estate investing which should be considered when deciding on real estate holdings. These risks may not be retrievable from technical analysis or mean-variance analytical techniques, but are nevertheless important considerations. The region of emphasis, Western Europe, generally steers clear of most of the risks due to the competitiveness of financial markets and the developmental maturity of Western European nations.

Along with currency risk, real estate investment vehicles carry other forms of risk. Conner at al. (1999) emphasize three categories of risk: country, real estate market (size of market, development of market, transparency, liquidity) and deal risk (leverage, tenant credit, currency denomination of rents). Most developed countries are backed by free market governments which curtail the severity of the above three risks. However, certain opportunities arise from countries with high levels of these risks. The knowledge gained by real estate experts may be scarce in underdeveloped markets, therefore remaining unexploited. Conner et al. (1999) suggests that global investors can create value by exporting their expertise. The developed market investors have more developed systems that can be exported to other markets, adding value to a real estate investment.

Many markets in developing countries suffer from threats to investing that are difficult to subdue. Kateley (2002) suggests that major red flags for investments include high current account deficits, over-valued exchange rates, high inflation, large short-term dollar denominated debt, low capital formation, poor regulation of the banking system and corrupt government oversight/cronyism. The United States currently characterizes a few of these threats, such as a large current account deficit. Its markets have taken a hit in response. It is well-known in Europe to invest in U.S.-domiciled real estate due to the suffering real estate markets and a favorable exchange rate. The more threatening risks can only be found in underdeveloped nations with high authoritarian pressures. A second major risk is lack of transparency and includes the lack of data on performance, lack of data on investments and lack of property rights. Kateley also cautions that in most markets there is a large degree of liquidity risk. Liquidity is a major risk for international investors and depends on the availability of debt and equity capital as well as the tax regime that exists in countries in question. It is simply difficult to accurately appraise, and
buy and sell properties in a timely fashion when countries lack the funds for statistical research and are not supported by a democratic government.

Another form of risk not necessarily influenced by an overseeing government in a nation-state relates to the interplay between real estate cycles and the maturities of finite life funds, such as closed-end funds. The development of finite life funds could potentially constitute a risk in relation with the real estate cycle. Many of the funds were created in the bullish part of the cycle, thus further increasing the demand for real estate. If such funds were to mature in bearish real estate markets, an increase in supply (through the selling of assets by maturing funds) could exacerbate the cycle. This risk should be contained given the small fraction of the universe of real estate assets held by funds (Hoesli and Lekander, 2008). Anticipation or speculation into the likelihood of a real estate cycle collapse could provide opportunities to buy real estate at exceptionally low prices.

5. The Sub-prime Crisis and Its Effects on REITs

As markets have supported, the symptoms of a vulnerable real estate market were first witnessed in the United States and then followed into Europe. Economic frailties in the US and Europe started as a result of over-relaxed lending and trading policies and by systematically overlooking sources of major risk.

5.1 How the Sub-prime Dilemma Originated

Varying ideas and suggestions as to the roots of the real estate collapse have been formulated by an array of credible sources and academicians. Two common observations seemed to surface almost unanimously: ravenous, loose lending policies and obscure modern investment vehicles. Two academic accounts will be detailed for the purpose of depicting an accurate account of the origins of the current state of the global real estate market.

5.1 (a) The Whalen Perspective

Whalen (2008) focuses on the lending practices encouraged by various governmental and private enterprise entities whose joint intention was mainly to push out the greatest number of real estate sales to boost economic and profitable growth, respectively. The causes, effects and consequences of the current subprime crisis are discussed. He argues that three basic issues are at
the root of the problem, the first of which is an “odious public policy partnership, spawned in Washington and comprising of hundreds of companies, associations and government agencies, to enhance the availability of “affordable housing” via the use of ‘creative financing techniques.’ To clarify, “creative financing techniques” are simply mortgages made more interesting for lenders that do not necessarily have the stability to pay off a 30-year loan. For example, lenders may be tempted by a teaser interest rate, or low fixed rate, for the first few years after the commencement of the mortgage pay-off schedule, that goes into a variable rate after expiration of the initial period. Second, federal regulators have actively encouraged the rapid growth of over-the-counter (OTC) derivatives and securities by all types of financial institutions. And third, is the related embrace by the Securities and Exchange Commission (SEC) and the Financial Accounting Standards Board of ‘fair value accounting’.”

The three roots of the problem proclaimed by Whales take a sequential form, which can be explained as a domino effect. First, affordable mortgages and loose lending policies allowed the most risky lenders to get their hands on a cheap debt. Then, risky mortgages were pushed through the financial system while losing their transparency and soundness as they were sold as mortgage-backed securities in complex derivatives. And, the Financial Accounting Standards Board added an incentive to private lenders by having banks carry the risk of capital devaluation on their balance sheets. As interest rates increased and 3-year grace periods expired, sub-prime lenders started defaulting on their mortgages and literally turning their keys over to the banks. The banks, which spread the risk through distribution of risky mortgage-backed securities, was unknowingly able to damage the pockets of a great number of many differing parties.

According to Whalen, “three trillion dollars in private label structured assets are being liquidated, with negative effects on banks, dealers, end investors and the economy.” Ultimately a large majority of the global population is now suffering, in part, from the effects of the real estate meltdown. Whalen also believes that the bottom in the U.S. housing market probably lies in 2009 since housing prices are generally lagging indicators. He claims that, “no amount of Fed interest rate ease can change the fact that reviving the housing market means that affordability must be restored to home valuations; that is, prices must fall substantially in many markets.” Real estate markets will not hit their lows until 2009, but many problems have unfolded in other sectors of the financial market and in the global economy as a whole.
5.1 (b) An account from Johnson and Neave

Johnson and Neave (2008) also outline the causes behind the subprime dilemma. It is found that a combination of need, greed, perverse incentives, inadequate risk controls, lax regulation, and lax oversight caused a bubble in the subprime mortgage market which has inevitably burst. Similar elements are mentioned consistent with the Whalen explanation. One point of clarification necessary is that the same real estate patterns that evolved in the United States also evolved in Europe.

Johnson and Neave attribute the difficulties in the subprime market to an evolving mismatch between loan quality, as measured by default risk, and the loans’ governance as measured by combined risk control capabilities of lenders and investors. The notions of greed, leading to lending to risky investors, and lax regulations, leading to all types of obscure derivatives was observed. The difficulties have been compounded by the use of collateralized debt obligations (CDOs) with varying exposure to the default risks and the further use of default insurance. Mortgage-backed securities are examples of CDOs. The situation has become still more complex because in the growing subprime market, default risks have increased dynamically, first as a result of responses to competitive pressure, and second as adjustable rate mortgages have been reset to require higher payments.

Johnson and Neave provide an excellent portrayal of the earlier called domino effect. “Combining the use of credit scoring technology with online investigation of potential borrowers’ credit ratings sharply reduced application processing costs, meaning that the profitability of placing new mortgages soared. The increased profitability of new placements led to soaring competition for new business, and as competition heightened both mortgage brokers and mortgage lenders relaxed their approval standards in a search to maintain newly established profits” (Johnson and Neave, 2008). Banks were blinded by their ability to move out mortgages which were once profitable to the point that risks were overlooked, especially because most banks insured the mortgage loans against default risk. Since mortgage lenders usually sold their portfolios of new loans to a trust, which then financed its acquisitions through CDOs and other similar instruments, lender fees for securities placements rose rapidly even as the need for greater risk control was obscured. All types of derivative instruments were created and sold to support the heavy growth in mortgage-debt. Dividing the portfolio financing instruments into tranches tailored investors’ risk-return exposure, and at the same time made it difficult for
institutional investors to ascertain the exact nature of the risks they were taking on, even as those same investors became particularly eager to buy what they regarded as high-quality debt instruments with attractive interest rates. Investors were unaware inherent riskiness of the products in which they were placing their money.

According to Johnson and Neave, the American residential mortgage market consists of some $10 trillion worth of mortgage loans. Approximately 75 per cent are securitized, mainly by the government-sponsored agencies, Fannie Mae and Freddie Mac. Seventy-five percent of American mortgages therefore do not earn money by accruing interest for banks, but make revenues from distributing the mortgages to different trust and funds. Most of this mortgage lending market involves little risk, either to the original lenders or to the subsequent investors in lender-created mortgage pools. The original lenders face relatively minimal default risks because two-thirds of conventional mortgage borrowers enjoy good credit, have arranged an insured fixed-rate mortgage, and have a significant equity investment in their houses. When mortgages are securitized, default risk remains either the responsibility of the original lender or the specialized trust to which mortgages are sold. To banks and other lenders, pushing mortgages was a profitable and seemingly low-risk business. Risks were diversified and insured. Unfortunately, subprime borrower mortgages began dominating the pooled funds and trusts, and were much more risky than initially perceived.

5.1 (c) News Publications’ View on Real Estate Markets

Due to the current relevance of the topic, credible news publications have been used for their capacity to provide the most recent information on the real estate market condition. In this section, several articles are summarized explaining the proceedings which led into the real estate slump.

The first article from the October 11, 2007 issue of the Economist explains the correlations between the real estate markets and the financial sector and also details how different property types may have been affected. “Banking crises and property crisis often go hand in hand. Even though commercial and residential property do not necessarily move together, the same factors associated with the American housing market, tighter lending standards and slower economic growth, should hurt business demand for office and retail space as well.” Small business owners were increasingly encouraged to purchase small store locations
or offices. Many of these entrepreneurs carried the same level of risks as did the sub-prime cohort responsible for the large default rate in the residential real estate markets. Like residential mortgages, loans for offices and shops have been bundled up and sold to investors. Many investors found the mortgage-backed securities marketed to be a very promising venture.

The global real estate rise and fall of this decade has typically followed trends initiated in the United States. Figures from the National Association of Real Estate Investment Trusts, an industry body, show that “an investment in American property at the start of 2000 would have more than quadrupled in value by the end of last year. By comparison, the leading American share index, the S&P 500, returned just over 8% over the same period” (The Economist, Oct 11 2007). Investors’ appeal to real estate was justified for the first seven years of the decade. “According to the Investment Property Databank, 16 out of the 21 national property markets it covers delivered double-digit returns last year. A global economic boom, allied with a desire by investors to diversify from equities and bonds, made property more appealing” (The Economist, Oct 11, 2007). A whole host of factors therefore led to the unhealthy and unsustainable growth of real estate.

The United States was not alone in the real estate boom and subsequent collapse. The British real estate markets also fell prey to the reckless real estate growth trend. On top of the enormous growth in the real estate markets in the United Kingdom, the British government came late with their decision to adopt the REIT-like structure onto their trading floors. Share prices of property firms in the UK had surged ahead of the government’s decision to introduce the tax-efficient Real Estate Investment Trust (REIT) structure in January of 2007. Adding to the real estate hype a tax-advantageous and liquid property share put even more pressure on overvalued real estate. In 2006, already more than half the money flowing into British mutual funds was invested in property (The Economist, Oct 11 2007). An overstated amount of real estate in portfolios is a sign of a real estate market bubble attributable to over-excitable investing in real estate.

Different American governmental and private organizations supported unethical movements to boost real estate market performance. Europe was by no means innocent in their pursuit of financial growth. Institutions of the United Kingdom, for instance, carried out questionable techniques to bolster the real estate market. For one, “they helped inflate a bubble in high-rise apartments by building flats that were more attractive to investors than to home-
buyers.” And second, some developers marked up the prices of apartments and then secretly discount them, allowing investors to give banks the impression that they had put up deposits (The Economist, May 22, 2008). None of these creative techniques benefited the average European resident, but were created for the benefit of larger investors.

In all, property markets are suffering great market capitalization declines in almost all countries in West Europe. “Stocks in the real estate sector have fallen about 27%, as measured by the EPRA/NAREIT Europe Index, since last June (2007)” (Wall Street Journal, April 30, 2008).

5.2 Large Differences between US and European Real Estate Markets

Gros (2008) discusses the differences between the subprime crisis in the US and Europe with detail provided about the efforts of the relevant monetary institutions. In Europe housing prices have increased over the last decade and, in many cases, even more than in the U.S. Over the last decade a curious phenomenon has emerged, with the exceptions of Germany and Japan, housing prices have risen almost everywhere to unprecedented levels. How could such a global cycle emerge when real estate is the most local of all assets? Recent research suggests that the global housing cycle was tightly linked to a large increase in the supply of liquidity by major central banks. Banks with a surplus of cash were able to provide cheap mortgages to risky borrowers and still maintain required reserves. “Sub-prime mortgages would probably not have been supplied on the same scale if central banks had not created an environment of ample liquidity and persistently low interest rates” (Gros, 2008).

When it comes to residential property, U.S. and European property prices have always been at least moderately correlated. “Over the last three decades, prices in the USA and Europe have tended to follow three slow-moving related boom-bust cycles” (Gros, 2008). Gros predicted that, if the past pattern holds house prices should be starting to fall very soon in (continental) Europe, too. In both the USA and Europe it seems that prices went 20-30% above their longer term average values. Excessive overshooting is likely to be followed by an overreaction in the opposite direction leading to undervaluation. This would imply that prices will probably have to fall by at least 20-30%, but possibly considerably more, before they bottom out. The anticipated down-spiraling house price cycles have now come to fruition.
Gros goes on to explain a key difference between banking systems and regulations that do put a wedge between the residential markets of the United States and of Europe. There is little evidence in the euro area of large-scale “sub-prime” lending, even though elements of loose lending policies were exemplified by European banks and subsequently tightened. The main difference in the banking system pertains to which party holds the risk of the devaluation of the property in question. “In the USA most mortgages are “no recourse”, which means that the lender (the bank) has no recourse to the owner of the house. If the value of the house is lower than the mortgage on it the borrower can just walk away, and simply send the keys to the bank” (Gros). This is what he calls “jingle mail”, and it was spreading rapidly in the USA as housing prices are declining almost everywhere. This “no recourse” nature of US mortgages means that a fall in house prices leads to severe problems for the banking system since mortgages still make up almost one half of all lending by US banks. “By some estimates the US banking system might lose all of its capital if house prices fall by more than 20-30%.” As this article was compiled slightly before the bank collapse epidemic, especially of mortgage lending-intensive financial institutions, Gros shows an exceptional degree of foresight.

In Europe, by contrast, borrowers cannot just walk away from a mortgage since they remain liable for any difference between the value of the property and the amount of the loan. In Europe a fall in house prices may make consumers poorer and less willing to spend but it does not threaten the stability of the banking system. What remains in question is why the European banks, semi-protected from a housing slump, still suffers the same fate as those in the United States. Perhaps the answer lies in the fact that European portfolio managers opted to diversify their portfolios by American mortgage-backed securities and therefore taking on U.S.-denominated default risk.

5.3 The Crisis Crosses the Seas: Links Between the US and Europe

To gain more recent perspectives on the links between the US and Europe, news publications were again the more current sources of information. The below articles outline a range of parallels between the two continents from trends in the direct real estate market to how it played out in the property stock markets. As a result of struggling markets in the U.S and Europe, many suggest that the investment safe haven exists in emerging markets.
The Wall Street Journal (March 25, 2008) puts percentages behind the real estate trends in Europe in an attempt to explain the similar patterns between the U.S. and Europe. For the European real estate markets to remain competitive, European financial institutions adopted similar self-destructive lending policies as the United States. “In Europe, slack lending policies and low interest rates helped drive up property values just as they had in the U.S.” (Wall Streets Journal, March 25, 2008). The notion that all real estate is of a local nature, and the pricing is therefore unique per region, has been put to the question “now that a home-price bubble has burst.” A great majority of the countries in Europe has followed the U.S.’s real estate market bubble leading into the second quarter 2007 and subsequently experiencing a crash of systematic proportions. “In 2006, home prices rose at a double-digit pace in Ireland, Spain, France and Norway, according to Moody’s Economy.com. Prices in Ireland fell 6% in the fourth quarter of 2007, after gaining 13% a year ago. In the U.K., prices gained 4.8%, compared with a gain of 10.5% a year earlier. Spain’ 4.8% gain compares with an increase of 9.1% the previous year.” As the figures demonstrate, real estate growth in Europe is undergoing a serious turnaround, just as the United States real estate sector has entered a free fall situation.

The Financial Times reports on the declining securitized real estate trend in the U.S. and Europe. “Listed property stock in many significant markets have suffered their worst quarter for seven years, with double-digit price falls in France, Germany, Italy, Japan, Sweden, and the UK. In the US, the biggest national market for property securities, there was a fall of 9.4 per cent in the three months to the end of June” (Financial Times, July 31, 2007). The effects of greedy, poor lending policies are now being felt by most of the major economies of the world. As a matter of fact, “global property stocks dropped by 4.5 per cent in the second quarter,” according to the S&P/Citigroup Global Property Index.

5.4 The role of Macroeconomic Policy

Certain macroeconomic variables also play a large role in the current state of the economy. Central banks have tried to subdue the economic downturn with little effect. As the Wall Street Journal (March 5, 2008) puts it, “high interest rates have been the real culprit for the recent housing slowdown, as the European Central Bank (ECB), the Bank of England and other central banks have tried to slow inflation.” Europe’s real estate trend has lagged behind that of the United States. “Europe’s great housing boom stalled in late 2007, trailing the U.S. trend by
more than a year” (The Wall Street Journal, March 5, 2008). Similarly, other systematic factors originating in the U.S. have made their way to Europe. In Europe, credit has become more expensive and less available, since the U.S. subprime-mortgage crisis washed over to Europe in the summer of 2007, “denting buying power and consumer confidence.” The last resort in financial markets and economies for sources of credit are central banks.

The ECB seems to prioritize keeping inflation low to fight the economy, but inflation was staying high due to the steep rises in oil prices. Many of the central banks in Europe have raised interest rates, stunting consumption habits. The overruling central bank, the European Central Bank is also running into unprecedented issues. One of the ECB’s primary objectives is to keep inflation to a minimum. However, while interest rates need to be lowered to stimulate spending and investing, inflation is at 3.5%, leading to reluctance by the ECB to want to slash rates (The Economist, April 10, 2008). The impact of monetary policy tools take several quarters to take an effect on the economy, but have not shown signs of progress. The impact of interest rates and inflation on the market sentiment in real estate markets will be examined in the data analysis section.

5.5 Exchange Rate Trends Leading into the Recession

To understand real estate issues on a continental scale, foreign exchange rates play an important role. Sharma (2008) provides a commentary on the relationship between the Euro and the Dollar. “The euro has established itself as the world’s second most international currency, despite the fact that the European Central Bank has never actively sought to promote the euro’s use outside the euro zone. In October 2006, the value of the euro notes in circulation worldwide exceeded the value of total US currency in circulation.” The dollar, which for decades was deemed the reserve currency in the world, is having its taken by the euro.

The dollar’s low value compared to the euro is in many ways beneficial. The obvious is that a low relative currency is favorable to export markets. The United States has received a little help in maintaining jobs in the export markets due to a low exchange rate. Foreigners, even though wary of economic woes in the United States, are also buying up American property at a relatively inexpensive price, which may slightly recover the housing bust in the United States. Particular attention will be paid to the relationship between REIT prices and the exchange rate between the United States, the Europe Union and the United Kingdom.
To build a base of knowledge about international real estate, international real estate in an efficient portfolio has been discussed. The Real Estate Investment Trust has been established as a suitable proxy for the real estate conditions in today’s economy. The impact of market sentiment on investing in real estate has been discussed. The different types of property, and their role and resiliency in European real estate, has been detailed. And finally, the real estate and general economic slump has been placed in perspective.

C. DATA AND METHODOLOGY

1. Sources and Variables

To understand how exactly real estate markets in Europe have been affected, REIT data was collected and analyzed to draw conclusions. The primary source for the relative data was collected from Bloomberg, which primarily consists of daily bid-ask rates from January 2000 to April 2008. In total, over 300 REITs of all different property types from both the United States and Europe were compiled for spread examination. After filtration for REITs with histories spanning back before the year 2000 with significant trading volumes, over 100 REITs remained from Europe and the United States to represent the real estate markets in Europe and the United States.

The bid-ask spread of a certain security is a measure of market sentiment. A larger gap between the bid and the offer rates suggests that the market is taking a bearish stance. Market sentiment is measured using the relative bid-ask spreads for U.S. and European REITs. In theory, bid-ask spreads increase as market participants become more fearful. The bid and offer rates are recorded for all major active REITs in Europe and in the United States. A comparison between REIT performance in the United States and in Europe is conducted to measure differences in market opinion between Europe and the U.S.

To calculate the relative bid-ask spreads, the bid price is subtracted from the ask price and then divided by the ask price to formulate a percentage spread. Bloomberg offered almost all the daily bid and offer quotes except the holidays and weekends when markets in Europe and the U.S. are closed. In total 2062 observations were aggregated for both U.S. and E.U. REITs to provide a dynamic result.

Bloomberg was also used to collect inflation rates, interest rates and exchange rates which were aligned with the REIT observations so that correlation and regression analysis could
be performed. Inflation rates, interest rates and exchange rates will be used as explanatory variables for the bid-ask spread. First, each of them will be analyzed individually in the form of a simple linear regression and will conduct a multi-regression analysis to find which combination of variables best explains the bid-ask spreads for Europe and the United States. Several benchmark figures will also be analyzed and compared to the geometric mean of the REIT spreads to offer completeness to the data. General stock market indices, such as the S&P 500 and from each of the individual country stock markets are used as a means of comparison along with real estate and REIT-specific indices.

2. Descriptive Statistics

The descriptive statistics in itself express some very differing qualities between the REIT markets in the U.S. and Europe. The mean spread for the U.S. REITs is ten times that of the European REITs, with figures of 14.39% and 1.51%, respectively. The range between the U.S. bid and ask rates are significantly broader than those of the European REITs, ranging from 0 to 97.76x for U.S. REITs and 0.57% to 5.27% for European REITs. It is observed that the highest one-day spread for U.S. REITs is considerably less than the mean American spread. One explanation for the variations between the U.S. and European REITs are the several outliers which exist within the U.S. REITs sample. The outliers in the U.S. REITs sample may indicate that more volatility is present within the securitized real estates markets in the United States. However, when the outliers are controlled for, the mean relative spread for the American REITs is reduced but remains significantly higher than the average spread in Europe. In general, the spreads are much wider for U.S. REITs than for those of the European Community. Another worthy observation is the variance of the two samples. The U.S. REIT spread sample variance is 7.35, while that of the E.U. is 0.000039, also showing the lower volatility predictability of E.U. REIT spreads. Again, when outliers are controlled for, the sample variance is reduced to a statistically significant variance.
The descriptive statistics provides some significant insight into the continental REIT markets. Direct comparison between the two REIT markets and a look into general indices and other macroeconomic will offer a more detailed and accurate portrayal of market sentiment and economic conditions.

D. Findings

For full exploitation of the data-set, the data is initially analyzed in a most basic sense and then analyzed with more complex calculations and regressions. First, patterns from the REIT spread data were evaluated in the form of a scatter-plot with time as the explanatory and the relative spread as the dependent variable. Further on, correlations between US and EU REITs are examined and a multiple regression analysis and time-series analysis were completed to find the best possible explanation and relationship between the market sentiment in securitized real estate markets and how they relate to macroeconomic variables.

1. A Look at REIT-spread Patterns

At a first glance at the REIT spread data from January 1, 2000 to April 30, 2008, we notice a very different trend between the REIT markets. Both US REIT spreads and EU REIT spreads show clear patterns throughout the duration of the study. However, the sample from the

<table>
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<tr>
<th></th>
<th>US REITs</th>
<th>EU REITs</th>
<th>US REITs (w/o outliers)</th>
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<td>Geometric Mean</td>
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<td>0.000269918</td>
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</tbody>
</table>

Table 1: Descriptive Statistics – US REIT spread (with and without outliers) & EU REIT spread
United States shows a gradual increase in the relative spread until the first quarter of 2007 when the relative REIT spread drops to levels lower than 1 percent.

![US REIT Spreads](image1)

![EU REIT Spreads](image2)

Figure 2: A Graphical Representation of REIT spreads from Jan. 2000 to April, 2008

The EU REIT spreads experience a gradual decline according to the graphical. Volatility in the EU spreads also decreases during the duration of the study. The US REIT spreads are much higher than its European counterpart until signs of the real estate market slump start reaching the public, in which case the US REIT spreads suddenly fell below 1%, less than the average spread for the EU during the same period. The only similarity between the US and EU REITs is that the REIT spreads are the lowest during the final portion of 2007 and beginning of 2008. Findings from viewing the REIT spread trends in a graphical format have so far shown opposing patterns to our hypothesis, that; ‘when spreads are high, investor sentiment should be low, and market conditions poor.’ In the summer of 2007, news started spreading about the poor
conditions of the securitized and unsecuritized real estate markets, which should have evoked fear in the hearts of noise traders. Noise traders, being primarily responsible for the existence of market sentiment, should cause the bid and offer prices of investments to widen when they are fearful of the stability of the financial markets. On the contrary, the bid-ask spreads have fallen as news of the poor conditions of real estate-related investments led to the irrational systemic reaction of many noise traders of selling their assets in unanimity. There is a direct positive relationship between the bid-ask spreads and market sentiment, while there should be a negative relationship. Further on, the relationship between the bid-ask spreads in the US and the EU and the different indexes will be analyzed in order to see exactly what effect the general and property markets have on REIT spreads.

2. Direct Correlations between US and EU REIT Spreads

The first hypothesis that tested is whether a direct relationship exists between real estate-based market sentiment in the US and in the EU. The first examination is therefore whether a correlation exists between REITs spreads in the EU and Europe is conducted. It was anticipated that there would exist at least a moderate relationship between the REIT spreads in the two relevant markets, but that there would be a time lag between the two continents as provided by the literature review. Looking at the direct correlation without compensation for a time lag, the correlation coefficient was 0.0336, an insignificant figure. In other words, there was no considerable relationship between the REIT spreads of the United States and Europe.


To gain more insight on the patterns and predictability of REIT bid-ask spreads in Europe and the United States, simple regression models were conducted on both the US and EU data sets. As viewed in the previous section discussing the patterns of the REIT spreads, the American REIT spread graphical shows a gradual increase in REIT spreads followed by the sudden drop. The ordinary least squares equation formulated by the US REIT spreads is $y=3.268-0.0000821x$. Considering the change in the direction of the REIT spread development for the US, the simple regression analysis resulted in a negative slope with statistically insignificant supportive figures. The coefficient of determination, representing at what percentage time explains the REIT spread, is 0.02%, a highly insignificant figure. Also, 0 falls
within the 95% confidence interval, another measure supporting the limitation of the linear relationship between time and the REIT spread. US REIT spreads do not follow a linear model. There are distinctive patterns that may be explained by more complex mathematical models than the ordinary least squares regression model.

![US REIT spread Line Fit Plot](image)

**Figure 3: Simple Regression Line – US REITs**

![EU REIT Spread Line Fit Plot](image)

**Figure 4: Simple Regression Line – EU REITs**

However, the EU REITs do follow a linear model. As shown by the graphical, EU REIT spreads follow a gradual negative trend over the sample time period. The equation to this ordinary least squares regression line is $y=0.2308-0.00000567x$. Sixty-six percent of the
variation in the REIT spread is explained by the unfolding of time. Also, the 95% confidence interval is slim and far from including a zero and the P-value is 0, all indicators of a strong statistical significance. For the sample period, time is a strong determinant of what happens to the REIT spread percentage. According to the explanation provided by simple regression analysis for this sample period, EU REIT market confidence increases with time, perhaps as REIT markets are maturing and becoming more liquid. In subsequent sections, we will determine if multiple regressions, time-lag models or co-integration techniques better explain developments in REIT spreads.

4. Simple and Multiple Regression - Influences from other Factors

The second hypothesis that is tested is whether single or multiple macroeconomic variables have an influence on market sentiment in Europe or the United States. There are many factors which may affect or have an influence on the market sentiment in financial markets. Many of these factors may be related to the existence of fluctuations of macroeconomic variables, such as interest rates, exchange or inflation rates. Other factors which may influence REIT-spread-based market sentiment are movements in the general stock market. This section will test the effects of a multi-regression analysis on REIT spreads, with an array of variables that could be related or influence market sentiment in the securitized real estate markets.

Multiple regression analyses is performed by weighing REIT spreads patterns against trends in interest rates, inflation rates, exchange rates and combinations thereof. Observations were collected for each of the macroeconomic variables for North America, the UK, and Europe as a whole, to see which variable may have the closest relationship or the most influence on REIT spreads, and ultimately, market sentiment for real estate markets. The hypothesis is tested that macroeconomic variables have an influence on REIT bid-ask spreads in the US and Europe and ultimately on sentiment in the real estate financial markets.

REIT bid-ask spreads are also tested against the movements in the general stocks markets and movements in REIT indexes, to see if REIT spreads are a true indicator of market sentiment. The hypothesis is, in this case, whether REIT spread fluctuations have a significant relationships with fluctuations in the general and real estate-specific financial markets. In this fashion it can be tested whether market sentiment either bring about fluctuations in financial markets, or conversely, if fluctuations in financial markets affect the level of investor sentiment.
4.1 REIT spreads and Interest Rates

For the first test, simple and multiple regression analyses are conducted with either the US REIT spread or the EU REIT spread as the dependent variable and the interest rate as the independent variable. Daily interest rates are taken from the US, the UK and the EU central banks; the Federal Funds Rate, the Bank of England Official Bank rate and the ECB Minimum bid refinancing rate, respectively. Each of the central bank interest rates or a combination of two or all three are tested against the US and EU REIT spreads to find the most robust explanations for the existence of fluctuations in REIT spreads. Significant results from multiple-regression analysis may indicate that REIT spread fluctuations are of a more international nature as opposed to being influenced by one specific region.

Due to a sudden drop in the average REIT bid-ask spread and the existence of multiple outliers in the United States, interest rates seem not to have a significant affect on US REIT spreads. Most of the relational tests result in statistically insignificant figures. The only significant result when testing interest rate influence on REIT spreads is a multiple regression analysis testing US REIT spreads against all three of the relative interest rates. The null hypothesis is rejected at a 95% confidence interval and the F-test resulted in a moderately high figure of 12.72, indicating that a combination of all three of the central bank interest rate fluctuations may influence REIT spreads and market sentiment. According to the adjusted R-squared, 1.68% of variation of REIT spreads is explained by variations in a combination of the three central bank interest rates. Hypothesis 2 is not supported by the running US REIT spreads against interest rates. It can be interpreted from the regression tests that central bank interest rates are not a significant determinant of US REIT spreads and therefore do not significantly influence market sentiment. This is an important statistic, because it may indicate that some of the tools used by central banks, in particular the Federal Reserve, may only provide limited utility against the existence of market sentiment and threats on the financial markets. Central banks use interest rates to stimulate and dampen activity in the financial markets, by reducing and increasing interest rates. However, these results indicate that central bank-induced fluctuations in interest rates have limited influence on market sentiment. A possible explanation in defense of central banks is that a time lag exists of approximately three fiscal quarters between the implementation and the consequent effects on the economy of increases and reductions interest rates by central banks.
Tests to explain REIT spreads in Europe as a result of interest rate fluctuations show more indicative results. Testing REIT spreads against any of the central bank interest rates, individually or in combination provided a better explanation for fluctuations of REIT spreads in Europe than the results obtained from US REIT spread tests. It cannot be counted out that the relationship exists because of the steady decline in European REIT spreads, a clear linear pattern. However, the results derived from regression tests are strong enough to indicate that REIT spreads are truly subject to fluctuations in interest rates amongst other macroeconomic and external influences.

For EU REIT spreads, all the individual and combination central bank interest rates regression analyses produced significant results. The strongest relationship between central bank interest rates and EU REIT spreads is found, just as the US REIT spreads, from running a multiple regression on all the central bank interest rates. Interest rates explain 24.95% of the variation in EU REIT spreads. The significance of the relationship holds true at a 99% confidence interval. Hypothesis 2 is supported by running EU REITs against each of the three central bank interest rates. These figures entail that the hypothesis that REIT spreads are influenced by central bank interest rates is supported. Central banks therefore do have an impact on the continual well-being of investor sentiment in the aggregate. Central banks have attempted to use their interest rate instruments to improve market sentiment and get private and corporate investors investing their capital with confidence. The US has lowered interest rates in response to the credit crunch and the negative sentiment in the financial markets. Europe has, as of recent, also lowered interest rates in an attempt to stimulate the economy, in spite of its reluctance to use interest rates as a means of monetary policy regulation. The positive effects of central bank intervention have yet to be felt.

4.2 REIT Bid-ask Spreads and Inflation

For the second set of tests, simple and multiple regression analyses are conducted with either the US REIT spread or the EU REIT spread as the dependent variable and inflation rates as the independent variable. Inflation rate data was collected from the United States, the United Kingdom and the European Union. The inflation data includes the consumer price index for the US and the UK and the harmonized index of consumer prices (HICP) for Europe, collected from the respective governmental statistical and census bureaus. Similar to the analysis for interest
rates and the analysis that are described in subsequent sections, the dependent REIT spread variables will be tested against all regional inflation rates independently and in combination. Statistical strength as a result of tests with multiple regional inflation rate trends may insinuate strong internationality in influence on REIT spreads.

Tests run against the US REIT bid-ask spreads again result in weak figures when running regression with inflation rate data. The strongest statistical results are obtained from running a regression against all three of the inflation regions. Only 1.51% of the variation in US REIT spreads is explained by inflation fluctuations in the US and the EU. The null hypothesis that inflation affects REIT spreads can be rejected at a 90% interval for all variables, except for US CPI. The model in general indicates a lot of variation. Hypothesis 2 is again not supported by running US REIT spreads against regional inflation rates. It can safely be concluded that inflation rates are not a strong determinant of REIT spreads or market sentiment in Europe.

Testing the impact of inflationary fluctuations on REIT spreads in the EU again provided more promising results. Inflation in the EU alone did not provide statistically significant results when tested against EU REIT spreads. A combination of inflation rates from all three of the relevant regions again provided the best results with a combination of inflation rates from the US and the UK as a close second. According to results from the test, adjusted coefficient of determination, 46.36% of variation in the REIT bid-ask spreads in the EU are explained by a combination of inflation rates from the US, the UK and the EU. In the multiple regression equation formulated by running the test with all three inflation trends, each of the variables are statistically significant at a 99% confidence level. The high F-test statistic further confirms the strength of the model with a value of 593.47. Hypothesis 2 can be supported by running EU REIT spreads against regional inflation. There is a strong relationship between inflation and EU REIT spreads. As inflation varies in the three respective economies, REIT spreads move in a coherent fashion. Fluctuations in market sentiment can be anticipated from movements in inflation rates.

4.3 REIT Bid-ask Spreads Interest Rates and Inflation

Combining macroeconomic variables will provide an even better explanation for the existence of market sentiment. Analysis is performed testing REIT spreads in the US and the EU against both interest rates and inflation. The results are promising, since up to this point the most
robust results are produced for both the US and the EU from testing against both inflation and interest rates.

REIT spreads from the US still do not produce results that indicate that macroeconomic variables are a major contributor to REIT spread fluctuations and hence cannot sway market sentiment. When all three relevant central bank regional interest rates and UK and US CPI are tested against US REIT spreads, 2.16% of the variation in US REIT spreads is explained by the combination of inflation rates and interest rates. All variables are supported with a 95% confidence level, except for the Bank of England Official Bank Rate which thus is accepted by the null hypothesis. It is safe to say that a relationship exists between US REIT spreads and a combination of inflation rates and interest rates in the United States and the European Union. Hypothesis 2 can be supported when US REIT spreads are tested against both inflation and interest rates. Macroeconomic variables play a minor role in the existence of market sentiment in securitized real estate markets.

Strong evidence is found to support that EU REITs are affected by macroeconomic variables in the US and the EU. 60.13% of EU REIT spreads are explained by a combination of the Federal Funds rate, the Bank of England Official Bank rate, the ECB minimum bid rate, CPI in the US and CPI in the UK. EU HICP has to be left out again to strengthen the model. The reason HICP may reduce the strength of the model is that inflation is based on the harmonization of a large number of European countries with differing economies and differences stages of economic development. All the variables are supported at a 95% confidence interval. Hypothesis 2 is well supported by running EU REIT spreads against both inflation rates and interest rates. The ebbs and flows in investor sentiment are shown to be dependent on fluctuations in macroeconomic variables.

4.4 REIT Spreads and Exchange Rates

Another force with the capacity to sway confidence in financial markets are foreign exchange rates. Since the European Union took up a single currency, the dollar and euro has established a peculiar short history. Initially, the euro was worth less than one dollar. The euro was expected to settle at $1.17/€, but actually reached a high of $1.60/€ in 2007. The average exchange rate over the sample period is $1.14/€, which is pretty close to the anticipated exchange rate. Exchange rates are a major consideration in the world of investing and require
enormous attention. As mentioned, the returns generated by investing in real estate are heavily affected by exchange rates. Some studies mention that hedging exchange rate exposure may compromise the risk-return characteristics of securitized real estate. Considering all the academic findings in regards to exchange rates, assumptions can be made that exchange rates has a significant impact on REIT spreads, if REIT spreads are in fact an appropriate proxy for market sentiment.

Tests against US REIT spreads again do not show results in support of influence from foreign exchange. No statistically significant results are found from testing US REIT spreads to any single or combination of exchange rates. Hypothesis 2 is not supported by running exchange rates against US REIT spreads. Market sentiment for securitized real estate markets in the US is not dependent on the foreign exchange markets of some of the world’s most abundant currencies, the American dollar, the British Pound and the Euro.

The EU REITs, however, show very indicative results. Although any combination of exchange rates resulted in high statistical significance, the dollar-euro exchange rate is the best explanatory variable to EU REIT spreads. 64.29% of variation in REIT spreads are explained by fluctuations in the dollar-euro exchange rate. The strength of the model is further supported by the narrowness of the confidence interval even at a 99% level. Hypothesis 2 is once again strongly supported by running EU REIT spreads against exchange rates. It can be interpreted from the relationship between EU REIT spreads and exchange rates that REIT spreads are influenced by fluctuations between the exchange rate between European and US currencies. Diligence is required in mentioning that there most likely are instances of multicollinearity. It must have been noticed by the reader that EU REIT spreads seem to be robustly explained by an array of macroeconomic variables, while there must also be a whole host of other variables responsible for fluctuations in market confidence. Inflation and interest rates are directly responsible for fluctuations in exchange rates. In other words, inflation and/or interest rates are likely to influence REIT spreads and market sentiment in the same manner as exchange rates, because a relationship already exists within the variables in question. In any case, exchange rates do have a strong relationship to market sentiment and must be taken into consideration when conducting international market sentiment studies.
4.5 REIT Spreads and Interest Rates, Inflation & Exchange Rates

As expected, the greatest degree of explanation is uncovered from testing REIT spreads against all three of the macroeconomic variables. The strength of the findings goes for both EU and US spreads. Mentioned in the above section, multicollinearity unquestionably exists within the model, but a combination of all the variables does provide some additional explanatory power. The best explanations for both EU and US REITs are produced from including US and UK CPI, European HICP, the federal funds rate, the Bank of England official bank rate, the ECB minimum bid refinancing rate, the dollar-euro exchange rate and the euro-British pound exchange rates. The exchange rate between the dollar and the British pound is left out because the relationship between the two currencies is already fully represented within the other two exchange rates.

Even though calculations on all the variables produce the most robust results, the US REIT spreads still can be considered as being negligibly influenced by macroeconomic variables. According to the model inclusive all the variables mentioned above, 2.28% of US REIT spreads are explained by a variation in fluctuations of these macroeconomic variables. Due, in part, to the existence of multicollinearity, several of the variables fall outside of a 90% confidence interval, and therefore are not statistically significant. Hypothesis 2 is not supported by running US REIT spreads against all three forms of macroeconomic variables. If US REIT sentiment is subject to macroeconomic variables within the sample period, it is only to a marginal degree.

The most robust findings for the EU REIT spreads can be attributed to a combination of all macroeconomic variables. Inflation and interest rates alone do not amount to the best explanatory combination of variables. Exchange rates, even though fully subject to inflation and interest rates add a subjective explanatory element to the existence of market sentiment in Europe. 69.27% of variation in EU REIT spreads is explained by a combination of fluctuations in the varying European and US inflation rates, interest rates and exchange rates. Hypothesis 2 is best supported by running EU REIT spreads against a combination of all three of the macroeconomic variables. These tests insinuate that macroeconomic variables do influence investor sentiment. Investors in real estate funds are affected by news media pertaining to governmental decisions to raise or lower respective interest rates, and indirectly to aggregate increases in local currency prices of consumer goods, and indirectly to relative exchange rates, likely increasing the values or costs of respective real estate investments.
4.6 REIT Spreads and the General Stock Markets

The third hypothesis that is tested in this thesis is: Performance of the general stock market has influence on the existence of market sentiment in the US or the EU. It is easy to assume that market confidence has a strong relationship to stock market indices, assuming investors will buy stock when confident. However, in this section, the relationship between REIT spreads and the general stock market, market indices being the proxy, will be examined to test the existence of a relationship to the general stock market. The market indices chosen to represent the general stock markets, which were tested against REIT spreads consisted of the Stockholm Stock Exchange, Amsterdam Exchange Index, Paris Bourse 40, German Stock Index, London Stock Exchange - FTSE 100, Dow Jones Industrial Average, S&P 500 Index. We will test if market sentiment in REIT markets may be subject to and have predictive properties over the general stock market. If a relationship is not found, three arguments can be conjectured; 1. REIT markets behave differently than the general stock market (there is a low correlation between real estate and the general stock market), 2. REIT market sentiment only has limited relationship with the ebbs and flows of the general stock market, 3. REIT Bid-ask spreads are not an accurate proxy for market sentiment in securitized real estate markets.

Average US REIT spreads again do not have any relationship to the general stock market. When compared to any of the major stock market indices in the United States and Europe, no hint of statistical significance can be extracted from the tests. It can hence be interpreted that there is no relationship between market sentiment in US REITs and any major stock markets. Hypothesis 3 is not supported by running US REIT spreads against general stocks markets. The fact that US REIT spreads drop to very slim levels in the last two years of the study may prove that market sentiment in the US real estate securities markets may be limited as it is. We must assume that, at least for US REIT spreads, one of the above explanations must be excepted/

EU REIT markets again show to be more influenced by outside forces than US REIT spreads, including fluctuations in general stock markets. Most of the relationships between EU REIT markets and the general stock markets are moderate at best. Macroeconomic variables certainly offer a better explanation for the existence of market sentiment in EU REIT markets. The index that shows the strongest relationship to EU REIT markets is the Dow Jones Industrial Average, explaining 29.38% of the variation in REIT spreads. The relationship is on all counts fully statistically supported. The confidence intervals are narrow, the P-values for each of the
variables are negligible, and the F-stat is relatively high at 856.28. Market sentiment in EU REIT markets either are partly affected by bullish and bearish conditions in the DJIA or market sentiment from securitized real estate markets sways the overall prices in the Dow Jones and other stock markets. These findings are of great importance, especially during the desperate market conditions in the previous five quarters. If 29.38% of the variation in REIT spreads can be interpreted from movements in the Dow Jones Industrial, then a significant degree of market confidence can be anticipated and accounted for. Hypothesis 3 holds true when US REITs are tested against general stock markets. When trends of widening or slimming bid-ask spread averages in REIT markets are becoming apparent, general financial market conditions may be moving accordingly.

4.7 REIT Spreads and the REIT Indexes

The fourth hypothesis that is tested is: Performance of the general stock market has influence on the existence of market sentiment in the US or the EU. Common sense would entice one to think that the relationship between REIT market sentiment and volatility in real estate market indices are strongly related. If REIT spreads are, under these circumstances, not strongly related, then the following can be assumed: 1. Market sentiment actually has a limited influence on the ebbs and flows in securitized real estate markets, 2. REIT Bid-ask spreads are not an accurate proxy for market sentiment in REIT markets. The real estate specific market indices chosen to represent securitized real estate markets consist of the S&P/Citigroup Index for Europe REIT, S&P REIT Index (capitalization-weighted of 100 stocks designed to measure performance of REITs), S&P/Citigroup World REIT Index and the FTSE NAREIT EQUITY REITs Index (Capitalization weighted index that includes all tax qualified REITs listed in the NYSE, AMEX, and NASDAQ National Market).

For the US REIT, one of the above explanations must be applicable, because the relationships found from the tests run against any of the individual real estate market indices turns out to be insignificant. US REIT spreads truly follow a pattern not explained by any of macroeconomic influences nor by movements in general or REIT-specific indices. Market sentiment may have an insignificant presence in securitized real estate markets.

Securitized real estate has a much greater influence on EU REIT spreads than US REIT spreads. While the US REIT spreads carry no statistical significance when tested against REIT
indices, EU REITs are well explained by each of the REIT indices. All of the REIT indices except the FTSE EPRA/NAREIT Global index explain variations of EU REIT spread between 57% and 60%, as explained by the adjusted R-square. The FTSE EPRA/NAREIT Global index only accounts for 39.14% of the variation in EU REIT spreads. All supporting statistical measures further support the strength in the relationship, with the P-values for each of the variables on all tests being practically 0 and the F-stat under all circumstances exceeding 2800. Hypothesis 4 is well supported by running EU REIT spreads against real estate market indexes. It can be assumed that there is a strong market sentiment influence on the real estate markets in Europe. Bid-ask spreads, even for REITs, are an important proxy for determining levels of investor sentiment. Extrapolation may serve as an accurate utility for determining the strength of real estate markets in the near future, also by examining trends in REIT bid-ask spreads.

5. Time Series Analysis

Hypothesis 5 states that: Real estate market sentiment patterns in the EU lag behind real estate market sentiment patterns in the US. In the literature review section of the thesis, it is mentioned that there is a time lag between economic and financial market developments between the United States and Europe. Therefore we will test whether US REIT spreads are a leading indicator for EU REIT spreads. This would mean that market sentiment for real estate markets due to certain positive or negative market conditions appear first in the US markets and then make their way over to Europe. Several generalized lag models of different time lags are formulated to find the optimal time lag between the US and the EU.

Testing US REIT spreads against EU REIT spreads lagged at 3 months, 6 months, 9 months and 1 year does not significantly improve the relationship between US and EU REITs. Hypothesis 5 is not supported when US REIT spreads are lagged against EU REIT spreads. As mentioned, the market sentiment trends in the US and the EU are entirely different. During the sample period, the US REIT spreads undergo a gradual increase followed by a sudden unrecovered drop, while the EU REIT spreads trends show a consistent gradual decline in the REIT relative bid-ask spread. It is concluded that market sentiment for real estate markets in the US and the EU behave in ways independent of one another. EU REIT spreads, and market sentiment does not significantly resemble US REIT spreads patterns even after lagged periods of 3 months, 6 months, 9 months or 1 year.
E. CONCLUSION

Two research questions are answered in this thesis: 1. Does market sentiment in real estate markets manifest itself in similar ways in the US and in the EU? 2. How is market sentiment in the real estate markets of the EU and Europe affected by macroeconomic variables, such as interest rates, inflation rates and exchange rates? These two research questions are answered by means of 5 hypotheses. The five hypotheses proved that there are no similarities between real estate-based market sentiment in the US and the EU. Therefore, market sentiment in the two relevant real estate markets does not manifest itself in similar ways. The findings differ greatly between US and EU REITs. US REIT spreads are shown to gradually increase followed by a sudden drop in the 1st quarter 2007, while the average EU REIT spread gap gradually closes over the sample period. US REIT spread patterns are found to behave independently from outside influences such as macroeconomic stimuli and market indices. EU REIT spread patterns are however very in-tune with outside forces. Strong relationships exist between market sentiment in Europe and macroeconomic stimuli and general and real estate-specific indexes. Due to US real estate market sentiment’s peculiar trends, it does not have any anticipative power over EU real estate market sentiment. The distinct patterns in both the US and EU REIT spreads may be attributable to the relative prematurity of both the markets. As REIT markets grow in market capitalization and in complexity, the REIT spread patterns for both regions may become more random and also more integrated with one another. However, the low correlation between market sentiment in relevant the regions indicate that diversification benefits remain exploitable.

As it relates to the current recession, REIT share prices quickly deteriorated and REIT markets collapsed in both the US and the EU. Contrary to current theory on market sentiment, REIT spreads for the US and the EU actually narrowed after first signs of real estate market gloom. This phenomenon may also be attributable to the prematurity of REIT markets and the fact that REIT shares may have been undervalued as compared to their underlying values. Due to the distressed state of REIT markets, a large margin between the bid and ask rates of REITs simply could not be demanded by financial institutions. In the future, tax-efficient REIT structures will gain popularity and more interesting information will be extractable from REIT markets.
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